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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/656,224

09/08/2003

Tzu Yu Wang

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04/27/2005

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EXAMINER

KEBEDE, BROOK

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,224

Applicant(s)

WANG, TZU YU

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/22/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species I, i.e., claims 11-17, in the reply filed on February 10, 2005 is acknowledged. Although applicant's identification of claims 18-24 as generic claim is not correct, claims 18-24 are belongs to Species I and treated with claims 11-17. The traversal is on the ground(s) that "the subject matter of claims 1-24 is sufficiently related that a through and complete search for the subject matter of the elected claims would necessary encompasses a through and complete search for the subject matter of the non-elected species..." This is not found persuasive.

A restriction requirement between patentably distinct species claims was issued in the Office action was mailed on October 5, 2005. "Section 121 [of Title 35 USC] permits a restriction for "independent and distinct inventions." Although 37 CFR §1.141 provides that a reasonable number of species may still claimed in one application, it is still proper to restrict claims of different species as long as the Examiner shows *prima facie* case of a serious burden and appropriate explanation of separate classification, or separate status in the art, or a different field of search. For instance, Species I requires reverse process of Species II. Such distinct process require an independent search form one another which causes a great burden to the Examiner and it acquired different field of search and that, as a result, a restriction was necessary. Furthermore, applicant's contention that claims 18-24 are generic is not quiet correct because claims 18-24 have similar scope as of claims 11-17 and belongs to the elected species. An explanation was provided in the restriction requirement. Specifically, in addition to being

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burdensome, the examiner indicated that restriction is proper because different species in the claims are required "different field of search."

The criteria of distinctness and burdensomeness have been met, as demonstrated hereinabove. Accordingly, the restriction requirement in this application is still deemed proper and is therefore **made FINAL**.

2. Accordingly, claims 1-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on February 10, 2005.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the **"implanting one of helium, neon, krypton or xenon into the implanted silicon layer to create a strain between particles of the silicon layer and implanted helium, neon, krypton or xenon ions,"** as recited in claim 11, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must

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be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 11 recites the limitation "implanting one of helium, neon, krypton or xenon ions into the implanted silicon layer to create a strain between particles of the silicon layer and implanted helium, neon, krypton or xenon ions" in lines 9-11. However, the recited limitation has no support in the specification.

Claim Objections

5. Claims 11, 19 and 22 are objected to because of the following informalities:

Claim 11 recites the limitation "implanting boron ions into the silicon material layer to form an implanted silicon layer; implanting one of helium, neon, krypton or xenon ions into the implanted silicon layer to create a strain between particles of the silicon layer and implanted helium, neon, krypton or xenon ions" in lines 9-11. However, the recited claim contains improper Markush group of claims. It is improper to use the term "comprising" instead of

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"consisting of" See *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). Appropriate correction is required.

Claim 19 recites the limitation "The method of claim 18, wherein the step of creating a barrier in the layer of semiconducting material comprises implanting one of helium, neon, krypton or xenon ions into the layer of semiconducting material" in lines 1-3. However, the recited claim contains improper Markush group of claims. It is improper to use the term "comprising" instead of "consisting of" See *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). Appropriate correction is required.

Claim 22 recites the limitation "The method of claim 18, wherein the second layer comprises one of silicon, gallium, or a combination thereof" in lines 1-2. However, the recited claim contains improper Markush group of claims. It is improper to use the term "comprising" instead of "consisting of" See *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 11, 13, 14, 18, 19 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang (US/6,159,810).

Re claims 11, 18 and 19 Yang discloses a method for suppressing boron penetration of a gate oxide during the manufacture of an integrated circuit, comprising: providing a substrate (11

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21); forming a plurality of isolation regions (20); forming a layer of gate oxide (13 23) over the substrate (11 21); depositing a layer of silicon material (15 25) over the layer of gate oxide (13 23); implanting boron ions (see Col. 4, lines 27-39) into the silicon material (15 25) layer to form an implanted silicon layer (15 25); implanting ion consisting of one of helium, neon, krypton or xenon ions into the implanted silicon layer to create a barrier layer and a strain (117) between particles of the silicon layer and implanted helium, neon, krypton or xenon ions (Col. 4, lines 47-61) ; patterning the implanted silicon layer (15 25) and the layer of gate oxide (13 23); activating the implanted boron ions; and forming source and drain regions in the substrate (see Figs. 2-12 and Col. 4, line 17 through Col. 10, line 40).

Re claim 13, as applied to claim 11 above, Yang discloses all the claimed limitations including the limitation wherein the plurality of isolation regions are formed by using a local oxidation of silicon process (see Figs. 2-12 and Col. 4, line 17 through Col. 10, line 40).

Re claim 14, as applied to claim 11 above, Yang discloses all the claimed limitations including the limitation wherein the plurality of isolation regions are formed by using a shallow trench isolation process (see Figs. 2-12 and Col. 4, line 17 through Col. 10, line 40).

Re claim 22, as applied to claim 18 above, Yang discloses all the claimed limitations including the limitation wherein the second layer consisting of one of silicon, gallium, or a combination thereof (see Figs. 2-12 and Col. 4, line 17 through Col. 10, line 40).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 12, 15-17, 20, 21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (US/6,159,810).

Re claims 12, 16, 20 and 23, as applied to claims 11 and 18 respectively in Paragraph 7 above, Yang discloses all the claimed limitations including using predetermined dose of inert (i.e., such as one of helium, neon, krypton or xenon ions) and born ions. Furthermore, the claimed dose concentration range would have been optimized in order to achieve the desired device performance.

One of ordinary skill in the art would have been motivated to optimize the dopant dose range by using routine experimentation in order to achieve the claimed dopant dose range in order to achieve the desired device performance.

Therefore, it would have been to one having ordinary skill in the art at the time of the invention is made to optimize the dopant dose rant, since it has been held where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed dopant dose range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must

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show that the chosen dimensions are critical. See *In re Woodruff*, 919, f.2d 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

Re claims 15, 17, 21 and 24, as applied to claims 11 and 18 respectively in Paragraph 7 above, Yang discloses all the claimed limitations including using predetermined energy to produce implant ions, i.e., such as one of helium, neon, krypton or xenon ions, and born ions having predetermined density. Furthermore, the claimed implant energy range would have been optimized in order to achieve the desired implant energy.

One of ordinary skill in the art would have been motivated to optimize the implant energy range by using routine experimentation in order to achieve the claimed implant energy. Therefore, it would have been to one having ordinary skill in the art at the time of the invention is made to optimize the dopant dose rant, since it has been held where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed implant energy range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919, f.2d 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

Conclusion

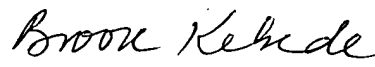
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Schwalke (US/5,882,964) and Visokay et al. (US/2004,0007747) also disclose similar inventive subject matter.

Correspondence

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (571) 272-1862. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Brook Kebede
Examiner
Art Unit 2823

BK
April 25, 2005